

REMARKS

Claims 1-2, 4-37 and 39-48 were pending in the application. Claim 33 is canceled. Claims 2, 11, 13, and 32-35 were objected to as allowable if amended into independent form. Applicants respectfully request reconsideration of the rejections of pending claims 1-2, 4-32, 34-37 and 39-48, including independent claims 1, 21, and 29.

In the Office Action, Claims 1, 4-10, 12, 14-31, 36-37, and 39-48 were again rejected pursuant to 35 U.S.C. §103(a) as being obvious over Hsieh et al. (U.S. Patent No. 6,574,304).

Independent claim 1 recites a processor operative to recognize one or more non-cyclical distinguished events and to select a portion of an ultrasound examination based on the recognition of the one or more distinguished events. The recognition of the one or more non-cyclical distinguished events is based on analysis by the event recognition processor of ultrasound image data sets of the ultrasound examination. Hsieh et al. guide acquisition of additional data with computer assisted diagnosis (CAD) (col. 2, lines 36-44). An image is acquired (col. 5, lines 49-50; and col. 8, lines 28-37). CAD detects features in the image (col. 5, line 62 - col. 6, line 11, col. 8; and col. 8, lines 38-56). Another image is acquired or different post-processing is performed to obtain further information if desired (col. 7, lines 35-42 and 58-63; col. 8, line 57- col. 9, line 13; and col. 10, lines 48-51). The initial image is typically stored (col. 8, lines 36-37). Some or all of the images may be presented to the physicians (col. 9, lines 9-13). Figure 5 shows completion by acquiring further image data (col. 10, lines 48-58). Hsieh et al. acquire data or images until the examination is complete to avoid repeated appointments. The feature of an initial image triggers further acquisition. Hsieh et al. further examine a feature of an initial image in other images. There is no suggestion to recognize a distinguishing event constituting a subset of the examinations. The feature is not a distinguishing event constituting a subset.

The Examiner relies on the start/stop of the process. However, the starting begins with the first image and ends with the last image. There is no suggestion to recognize a distinguishing event constituting a subset of the examination.

Independent claim 1 recites the processor operative to select a portion of the examination. Hsieh, et al. only mention images being used. The Examiner cites to “a subset of images as in Fig. 7” (Office Action, page 3). Figure 7 shows acquiring an initial image 138, and

subsequent images 142 and 146 (col. 11, lines 21-34). The “initial” image means no images before. The subsequent images are acquired based on need (col. 11, lines 25-29), showing no acquisition of any other images. The whole examination is stored, not a portion.

The Examiner cites to “image subsets (82, 88, 92, 98)” (Office Action, page 3). Image 82 is an initial image (col. 9, lines 25-27), showing no images before not being selected. Additional processing may be performed for images 88, 92 and 98 to highlight further information (col. 9, lines 29-42). These four images are a series with different post processing performed sequentially (col. 9, lines 42-49). Every image created is analyzed. A portion is not selected for marking or storage.

The Examiner cites to “re-acquiring an ultrasound image set or subset (e.g. col. 2, line 44)” (Office Action, pages 3-4). Once a feature is identified, additional images may be reacquired at the suspected location (col. 2, lines 40-44). There is no discussion of other images not selected. Hsieh, et al. do not select a portion.

Claim 1 has been clarified to indicate that “portion” is less than all. The Examiner citations to Hsieh, et al. show different analysis or reacquisition, but not selection of less than all for marking or storage.

Claim 1 further recites that the ultrasound examination comprises a rolling stream of a series of ultrasound image data sets during a real-time examination, the recognition being based on analysis by the event recognition processor of the ultrasound image data sets of this ultrasound examination, and that non-selected portions of the ultrasound examination include ultrasound image data sets after the one or more distinguished events. The Examiner does not specifically note the stored or marked portions being disclosed as a “subset.” The Examiner appears to believe Hsieh, et al. show initial images being analyzed to trigger the “initial” images shown in Figure 7 and the images 82, 88, 92, and 98, thus providing images before the initial image (Office Action, page 4). However, there is no indication that these images are part of a rolling stream of a series of ultrasound image data sets during a real-time examination. CAD processes are typically applied after collection of the images (col. 1, lines 9-15), not during a rolling stream of a series of data sets during a real-time examination.

Hsieh, et al. identify an image and then direct an imaging system to re-acquire additional images (col. 2, lines 40-44). Subsequent images are acquired and stored (col. 9, lines 7-13; col.

9, lines 25-49; and col. 11, lines 11-34). Hsieh, et al. do not have non-selected portions of the examination that include image data sets after the one or more distinguished events.

Independent claim 29 has been amended to include the limitations of dependent claim 33. Dependent claim 33 was indicated as allowable. There are no intervening claims, so claim 29 is allowable.

Allowable claim 32 has been amended into independent form. There are no intervening claims, so claim 32 is also allowable.

Independent claim 21 recites automatically recognizing from image analysis and marking or storing non-repeating subsets of an examination where the one or more non-repeating subsets are bracketed by one or more pairs of distinguished events determined as a function of the image analysis. Hsieh do not deal with subsets for marking and storing. Instead, a same feature is imaged until sufficient. Identifying lack of sufficiency and sufficient imaging of a feature does not mark or store a subset of an examination.

Independent claim 21 also recites that the ultrasound examination comprising a rolling stream of a series of ultrasound image data sets during a real-time examination, and that portions of the ultrasound examination after at least one pair of the one or more pairs of distinguished events are not marked or stored. Claim 21 is allowable for the same reasons as claim 1.

Dependent claims 4-10, 14-20, 22-28, 30-31, 36-37, and 39-46 depend from the independent claims 1, 21, and 29 discussed above, and are thus allowable for at least the same reasons as the corresponding independent claim. Further limitations distinguish over the reference or references used to reject the dependent claims.

Claims 4, 12, and 37 recite determining a distinguished event based on a rate of change of brightness. Hsieh et al. identify shape, size, curvature, or density of a potential lesion (col. 6, lines 56-63). Change in brightness may be used to find edges, but there is no suggestion to use rate of change. There is no suggestion to use rate of change between images as claimed in claim 37.

Claim 5 recites recognizing a jet in color Doppler as an event. The Examiner cites to heart valve prolapse detection, but Hsieh et al. do not even suggest this as a type of feature to be detected (see col. 5, lines 57-61).

Claim 6 recites selecting a portion of the examination between events. Hsieh et al. acquire more images until sufficient information is provided. There is no suggestion that initial or earlier acquired images are not to be used. If not used, there is no suggestion to select anything other than the last image. Hsieh et al. do not suggest selecting between events.

Claims 8, 9, 27, 28, 30, 42 and 43 recite selecting additional portions before and after the events of the first portion. Hsieh et al. do not suggest selecting the additional portions.

Claims 10 and 45 recite causing fewer than all image sets of a selected portion to be stored. Hsieh et al. mention a memory for a large amount of data (col. 4, lines 30-31), and that the acquired images are stored (col. 8, lines 36-37). Even in the atypical situation, there is no suggestion to store fewer than the selected portion.

Hsieh et al. do not suggest the audible feedback of claims 15-16, a recording icon of claim 18, or an incremented number of claim 19.

Claim 39 recites a rate of change of high velocities. Hsieh et al. do not deal with velocities or rate of change, let alone a rate of change of high velocities.

Claim 44 recites inputting from a stored exam. Hsieh et al. avoid further appointments by operating in real time, so do not input a stored examination.

Dependent claims 47-48 are also allowable over Hsieh, et al. As noted by the Examiner, the information, metastasis or other features of Hsieh, et al. are non-temporal, so are not analysis of a real-time sequence, or transitions.

CONCLUSION

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof.

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